Geophysical Resource Web Services (GRWS) - A Workflow for GPS-Derived Data Products
http://reason.scign.org

Project Goals
1. Generate higher level products from Western US GPS data for use by the Geodetic community
2. Apply modern IT methodology to
   - Produce and disseminate higher-level products to a larger community of scientists, government agencies (Federal State), and local surveyors & GIS professionals
3. Build on capabilities developed for the SCIGN project in data archiving, information systems, and data analysis, to disseminate the following products:
   - Geodetic position time series
   - Crustal motion models
   - Strain maps
   - Geologic fault models
   - Near real-time earthquake response information
4. Geodetic reference systems for precise GIS and surveying
5. Design, develop and deploy user-friendly and user-interfaces; resource discovery, request and delivery mechanisms; data models and portal components for inter-project leveraging.

Now serving
1. Over 10 years of data for ~500 western US CGPS stations.
2. Dynamic, web-accessible source for vetted GPS solution "input" metadata in XML format.
3. Rigorous weekly GPS combination using 'st_filter' of data from (1) and metadata from (2).
4. Sophisticated TimeSeries Applet with full suite of combination components from (3).
5. Advanced online static-temporal visualization tool (see SOMI below) to be incorporated into ongoing portal development.

Currently developing
1. Additions to Service Oriented Architecture for combined GPS solution product delivery, registration, request & retrieval
2. Web-accessible components for portal development (see below)
3. Prototype framework for GPS Explorer, a public portal for online GPS-related analysis, science, teaching and discovery
4. Machinery to enable complete, on-demand re-processing
5. Public, queryable project metrics and usage interface

Moving towards
Full automation of...
1. Outlier removal
2. Quality reporting
3. Regional filtering
4. Spatial coherence detection
5. Integration with modeling databases (QuakeXML)
6. Velocity & strain map generation
7. Sub-daily and real-time solutions
8. and the public release of GPS Explorer.

Global GRWS Workflow

Integration
- Event detection
- Pattern recognition
- Attached processes
- Zero latency

Centralized Storage
- Oracle Database
- Common data models
- Well-defined integrity constraints

OGC Standards
- GML
- Filter Encoding
- WFS
- WMTS

Flexibility
- XSLT
- CGI Proxies
- Shell Script Wrappers

Distributed Analyses
- Scalable provider tier
- Common product formats
- Fast re-processing
- Network reconfiguration

Security
- Authentication
- Session tracking
- Location independent

Validation
- XML Schema
- Validation

DB
- SOAP and HTTP requests
- SOAP services
- Web Services proxy
- CGI request
- GET- enabled client
- Basic HTTP

Strain
- Geospatial Data
- Time Series
- Exploration
- Visualization
- Extraction
- Submission
- User notification
- Summarization
- Education

Maps
- Moving towards
- 2D
- Distributed via the Internet

Metadata
- 5
- Queryable
- in Space, Time & Description

Download this diagram, the supplemental workflow description, and sample command-line clients at:
http://reason.scign.org/scignDataPortal/grwsSummary.jsp

The diagram in this panel illustrates the web-services enabled workflow used by NASA JPL and SOPAC to create, exchange, query and display high-fidelity GPS-derived data products for the western United States and beyond.

The GPS Explorer portal is currently in development and will employ the web-services architecture shown here. Furthermore, some sample maps (below) from GPS Explorer provide some insight into the breadth of topics we intend to support through a generic geospatial-temporal interface called the SOPAC Online Mapping Interface (SOMI). More information on SOMI, as well as a public release of SOMI 3.0, is forthcoming.